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Vitamin D: Declining Levels Troubling, May Presage Serious Health Problems

Vitamin D plays diverse and profound roles in health – it lowers the risk of weak muscles and bones, cancer, heart disease, and depression. But the latest – and very troubling – news is that the average blood levels of vitamin D among Americans are decreasing and heading toward outright deficiency.

That's the finding of two recent studies in major medical journals.

Adit Ginde, MD, MPH, of the University of Colorado School of Medicine, Denver, and his colleagues analyzed data from two large studies of people, one conducted between 1988 and 1994 and the other between 2001 and 2004. The first study included information of vitamin D levels in 18,883 people, and the second study included data from 13,369 people.

From about 1994 to 2004, the number of Americans with normal levels of vitamin D (30 ng/mL or higher) decreased from 45 percent to 23 percent – meaning that three-fourths of American do not have optimal levels of the vitamin. In addition, the percentage of people with a severe deficiency (less than 10 ng/mL) increased from 2 percent to 6 percent during this time.

In addition, Black and Hispanic men and women had substantially lower vitamin D levels compared with white men and women. Darker complexions limit the skin's production of vitamin D after exposure to sunlight.

In the second study, Sandy Saintonge, MD, of the Weill Cornell Medical College, New York City, analyzed vitamin D levels in 2,955 people ranging from 12 to 19 years old age. She reported that low levels of vitamin D were widespread among teenagers, particularly among Blacks, Hispanics, girls, and those who were overweight.

Overall, about 11 percent of Black teenagers were deficient in vitamin D. However, Saintonge wrote, if the standard for deficiency was changed from 11 ng/mL to 20 ng/mL – as many experts have recom-

mended – 50 percent of Black teenagers would be considered deficient, as would be 14 percent of teenagers in general.

Current recommendations call for every infant, child, and adult supplementing with 1,000 IU daily, with a doubling of that amount for people with dark complexions.

References: Ginde AA, Liu MC, Camargo CA. Demographic differences and trends of vitamin D insufficiency in the US population, 1988-2004. *Archives of Internal Medicine*, 2009;169:626-632. Saintonge S, Bang H, Gerber LM. Implications of a new definition of vitamin D deficiency in a multiracial US adolescent population: The national health and nutrition examination survey III. *Pediatrics*, 2009;123:797-803. □

Perspectives

Sugar Wars – Nothing Natural

Despite the worldwide economic recession, one type of business seems to be profiting: candy shops.

Most of us have our comfort foods. It may be chicken soup, a slice of pizza, or a chunk of chocolate. A recent article in the *New York Times* reported that business in candy shops is booming. Business is especially good for inexpensive sweets, such as Hershey Kisses, compared with more expensive indulgences.

Interestingly, this sweet-tooth trend coincides with another trend, a shift from high-fructose corn syrup (HFCS) back to old-fashioned sugar (sucrose). Beginning in the 1980s, HFCS became the sweetener of choice in processed foods, soft drinks, and candies. It was sweeter than sucrose, had a longer shelf life, and less expensive. Consumption of HFCS skyrocketed, while sucrose consumption plummeted – though the average American's consumption of all added sugars has continued to climb to about 160 pounds per year.

Sucrose is a chemical compound, whereas HFCS is a blend of fructose and glucose, which leads to different metabolic effects. HFCS does a better job of raising triglycerides (a marker of diabetes and heart

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disease risk), and is more likely to lead to weight gain (in comparison to sucrose).

A lot of people (including me) complained about HFCS, and the giant junk food companies apparently listened. They've started returning to sucrose as a sweetener in frozen dinners, tomato sauces, salad dressings, and other products. With incredible audacity, companies are now describing sucrose as natural and healthy.

Natural and healthy? While HFCS does appear worse than sucrose, that doesn't make sucrose a healthy alternative. The ideal dietary solution is to emphasize fresh foods and to avoid packaged foods, especially those with any type of added sugar. – JC

Supplements of Probiotics Can Reduce Symptoms of Anxiety

Supplements of probiotics – representative species of “good” bacteria that inhabit our guts – can help prevent stomach flus and diarrhea. They can also improve mood and reduce anxiety, according to a new study.

The gut has been described as the “second brain” and the “enteric nervous system.” Anyone who has ever had that feeling of butterflies in the stomach has experienced the gut-brain connection.

A. Venket Rao, PhD, of the University of Toronto, Canada, and his colleagues treated 39 patients with chronic fatigue syndrome (CFS), giving them either a strain of *Lactobacillus casei* bacteria or placebos daily for two months. People with CFS commonly have symptoms of anxiety or depression, or both.

By the end of the study, the amounts of *Lactobacillus* and *Bifidobacteria*, another species of bacteria in the gut, increased substantially in the feces of people taking probiotics, but not among those taking placebos. The amounts of bacteria in feces typically reflects that of the gut.

“Overall, there was a significant improvement in anxiety among those taking ... [the probiotics] compared to the placebo,” wrote Rao.

Reference: Rao AV, Bested AC, Beaulne TM, et al. A randomized, double-blind, placebo-controlled pilot study of a probiotic in emotional symptoms of chronic fatigue syndrome. *Gut Pathogens*, 2009;1:6. doi 10.1186/1757-4749-1-6. □

Vitamin C from Supplements and Food May Help Prevent Gout

Men who consume ample vitamin C from either foods or supplements have a relatively low incidence of gout, and the risk of gout drops even further as vitamin C intake increases.

“Gout is the most common type of inflammatory

arthritis in men,” explained Hyon K. Choi, MD, DrPH, of the University of British Columbia, Vancouver, Canada.

Choi and his colleagues analyzed data from 46,994 men participating in the Health Professionals Follow-up Study. None of the men had been diagnosed with gout when the study began in 1986. After 20 years of follow-up, 1,317 men had been diagnosed with gout.

Men who consumed a total of 500 to 999 mg of vitamin C daily from a combination of foods and supplements were 17 percent less likely to develop gout. Men who consumed 1,000 to 1,499 mg of vitamin C daily were 34 percent less likely to develop gout, and those who had higher intakes of the vitamin were 55 percent less likely to develop gout.

Choi noted a similar pattern for just vitamin C supplements. Men taking 1,000 to 1,500 mg of vitamin C daily were 34 percent less likely to develop gout, and those taking at least 1,500 mg daily were 45 percent less likely to be diagnosed with gout. For each 500 mg increase in vitamin C intake, the risk of gout decreased by 17 percent.

Choi wrote that “vitamin C intake is strongly associated with a lower risk of gout. Increasing vitamin C intake may be beneficial in the prevention of gout.”

Reference: Choi HK, Gao X, Curhan G. Vitamin C intake and the risk of gout in men. *Archives of Internal Medicine*, 2009;169:502-507. □

Broccoli Sprout Extract May Have Benefits in Nasal Allergies

A natural compound found in broccoli sprouts and other cruciferous vegetables improves the ability of nasal cells to detoxify, or break down, and dispose of hazardous chemicals, which may blunt the effect of nasal allergies.

The compound, called sulforaphane, is known to boost the activity of the liver's phase 2 enzymes, which help break down and dispose of toxins.

Marc A. Riedl, MD, of the David Geffen School of Medicine at the University of California, Los Angeles, and his colleagues gave 65 healthy men and women either liquified broccoli sprouts or a placebo consisting of alfalfa sprouts. The dosages ranged from 25 to 200 grams of each type of sprout, roughly equivalent to about 1 to 7 ounces.

Sulforaphane is also found in regular broccoli, cauliflower, and brussel sprouts. However, broccoli sprouts average 20 to 50 times more sulforaphane than found in broccoli.

Using nasal fluid from the subjects, Riedl and his colleagues measured the activity of several antioxidant enzymes involved in detoxification. The enzymes included glutathione-s-transferase M1, glutathione-s-transferase P1, NADPH quinone oxidoreductive, and hemoxygenase-1.

Levels of the enzymes increased with the amount of broccoli sprouts, peaking at approximately a 20-time increase at the 200-gram dose.

Although Reidl did not test the broccoli sprouts on symptoms of nasal allergies, he did note their potential for reducing allergy-related respiratory inflammation.

Reference: Reidl MA, Saxon A, Diaz-Sanchez D. Oral sulforaphane increases phase 2 antioxidant enzymes in the human upper airway. *Clinical Immunology*, 2009;130:244-251. □

Studies Document Roles of Good and Bad Fats in Cancer

Two new studies add evidence supporting the role of omega-3 fish oils in reducing the risk of prostate and colon cancer.

In the first study, John S. Witte, PhD, of the University of California, San Francisco, and his colleagues compared the diets of 466 men diagnosed with aggressive prostate cancer and 478 age-matched control subjects. They also looked at how a genetic risk factor for prostate cancer was influenced by omega-3 intake.

Overall, men with a high intake of omega-3 fats, which have anti-inflammatory benefits, had a 63 percent lower risk of developing aggressive prostate cancer, compared with men who consumed few omega-3 fats.

Men with a particular genetic variation in their Cox-2 gene, which promotes inflammation, combined with low intake of fish oils, had a five and one-half time greater risk of developing aggressive prostate cancer, compared with men who consumed a lot of fish oils.

In the second study, Karsten H. Weylandt, MD, PhD, of Massachusetts General Hospital, Boston, and his colleagues studied the effects of arachidonic acid (AA), a pro-inflammatory omega-6 fat, and docosahexaenoic acid (DHA), one of the principal anti-inflammatory omega-3 fats.

Using colon cancer cells, he found that AA promoted cell growth, whereas DHA reduced the viability of cancer cells. DHA reduced AA-stimulated cell proliferation and significantly lowered the production of prostaglandin E2, a pro-inflammatory byproduct of AA. In addition, DHA reduced colon cancer cell proliferation, with higher

doses having a greater effect. DHA also reduced the activity of Cox-2.

References: Fradet V, Cheng I, Cassey G, et al. Dietary omega-3 fatty acids, cyclooxygenase-2 genetic variation, and aggressive prostate cancer risk. *Clinical Cancer Research*, 2009;15:2559-2566. Habel P, Weylandt KH, Lichopoj K, et al. Docosahexaenoic acid suppresses arachidonic acid-induced proliferation of LS-174T human colon carcinoma cells. *World Journal of Gastroenterology* 2009;15:1079-1084. □

Cutting Calorie Intake, Boosting Protein Promotes Fat Loss

Cutting calories and moderately increasing protein intake leads to substantially greater loss of body fat, compared with just cutting calories, according to a study conducted at the University of Illinois, Urbana.

Donald K. Layman, PhD, and his colleagues placed 130 obese men and women on one of two diets. For four months they ate a reduced-calorie diet, but the composition of the diets differed in several key respects. The moderately high-protein diet consisted of 30 percent protein, 30 percent fat, and 40 percent carbohydrate. The more traditional low-calorie diet consisted of 15 percent protein, 30 percent fat, and 55 percent carbohydrate.

After four months, both groups had lost the same amount of weight, but the higher protein group had lost 22 percent more body fat, compared with the high-carb group. After 12 months, 64 percent of the people in the protein group had more improvement in body composition, compared with only 45 percent in the carbohydrate group. In addition, 31 percent of the people in the protein group lost at least 10 percent of their weight, compared with only 21 percent of those in the carbohydrate group.

“Higher protein diets appear to increase satiety, increase energy expenditure, and/or maintain lean tissue with higher metabolic activity. Findings from this study support reduced food intake and improved body composition,” wrote Layman and his colleagues.

Reference: Layman DK, Evans EM, Erickson D, et al. A moderate-protein diet produces sustained weight loss and long-term changes in body composition and blood lipids in obese adults. *Journal of Nutrition*, 2009;139:514-521. □

Coenzyme Q10 Improves Hearts in People with Heart Failure

Coenzyme Q10 (CoQ10), a vitamin-like nutrient, plays an essential role in cellular energy production, and a small number of cardiologists have successfully used it to treat cardiomyopathy and heart failure, both diseases of the heart muscle.

In a recent study, Peter H. Langsjoen, MD, of

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Quick Reviews of Recent Research

• Low vitamin D linked to cognitive problems

Researchers at the University of Cambridge, England, analyzed blood levels of vitamin D in 212 men and women age 65 or older. People with the lowest levels of vitamin D were almost two and one-half times more likely to experience cognitive impairment. The researchers wrote that vitamin D may play roles in the production of new brain cells.

Llewellyn DJ. *Journal of Geriatric Psychiatry and Neurology*, 2009: epub ahead of print.

• Bee propolis high in antioxidants

Japanese researchers analyzed the antioxidant activity of bee propolis, royal jelly, and pollen. Each of these bee products had substantial antioxidant properties. Water-soluble extracts of propolis had the greatest antioxidant activity, and much of that activity was related to the presence of caffeic acid, a polyphenolic flavonoid.

Nakajima Y. *BMC Complementary and Alternative Medicine*, 2009;9:4.

• Gastric Bypass Patients Need Vitamin D

Researchers at the University of Nebraska, Omaha, tested several doses of vitamin D (800, 2,000, and 5,000 IU) daily on patients who had undergone the Roux-en-Y type of gastric bypass.

Coenzyme Q10 and the Heart...

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Tyler, Texas, reported that a relatively new form of CoQ10 led to improvements in seven patients with advanced congestive heart failure. All of the patients had been diagnosed with "class 4" heart failure, the most serious type. Their ejection fraction, a measure of the heart's ability to pump blood averaged 22 percent; 50 percent is considered normal.

Langsjoen reported that, using conventional CoQ10 (known as ubiquinone), he was not able to significantly increase blood levels of CoQ10 in these patients. He then tried a relatively new form of CoQ10, called ubiquinol or "reduced" CoQ10. The patient's blood CoQ10 levels increased from an average of 1.6 mcg/ml to 6.5 mcg/ml.

With the increase in blood levels of CoQ10, the patients' heart function improved as well. Their average ejection fraction increased to 39 percent, and four of the patients had stable ejection fraction increases to 50 and 60 percent.

Langsjoen believes that the ubiquinol form of CoQ10 may be better absorbed than the more common ubiquinone form.

Reference: Langsjoen PH, Langsjoen AM. Supplemental ubiquinol in patients with advanced congestive heart failure, *BioFactors*, 2008;32:119-128. □

They found that doses of 5,000 IU of vitamin D were both safe and necessary to treat patients with deficiencies after the gastric bypass procedure.

Goldner WS. *Obesity Surgery*, 2009;19:173-179.

• Chromium supplements help curb appetite

Forty-two overweight women were treated by researchers at Louisiana State University, Baton Rouge. The subjects were given either 1,000 mcg of chromium picolinate or placebos daily. The women taking chromium supplements had reduced hunger levels, fewer fat cravings, and less food intake, leading to a decrease in body weight.

Anton SD. *Diabetes Technology & Therapeutics*, 2008;10:405-412.

• Supplements reduce long-term cancer risk

In the 1990s, researchers showed that combined supplementation of vitamin E, selenium, and beta-carotene for five years significantly reduced the risk of stomach cancer, as well as the risk of dying from any type of cancer. In a follow-up study, researchers from the U.S. National Institutes of Health found that, 10 years after the subjects stopped taking those supplements, they still had a lower than average risk of developing stomach cancer or dying from any cause.

Qiao YL. *Journal of the National Cancer Institute*, 2009; 101:507-518.

• Garlic compound has anti-cancer benefits

Population-based studies have shown that people who eat a lot of garlic, which contains more than 200 different compounds, have a relatively low risk of developing cancer. Japanese scientists tested the effects of diallyl trisulfide, one of the compounds in garlic on colon cancer cells. The researchers reported that the compound interfered with the formation of tumors.

Seki T. *Asia Pacific Journal of Clinical Nutrition*, 2009; Suppl 17;1:249-252.

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